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Edgar F. Cyriac

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URINE SEGREGATION BY MEANS OF KIDNEY
MASSAGE. REPORT OF A CASE OF TU-
BERCULOSIS OF THE KIDNEY, WITH
SPECIAL REFERENCE TO THE
IMPORTANCE OF CYTOLO-
GIC EXAMINATION OF
URINE SEDIMENT.¹

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My attention was called to a somewhat unique method of urine segregation several years ago and I determined to make some investigations along this line, should the opportunity ever present itself to me. It was my good fortune a very short time after this to have a patient enter my private practice, complaining of stomach symptoms, the examination of whom revealed an associated pyuria which ultimately proved to be of tuberculous origin.

The difficulty of ureteral catheterization for diagnostic purposes is so great, particularly in the male, as to make its general employment a matter of great reluctance on the part of the general practitioner, who should be thoroughly familiar with the methods that lead to definite genitourinary diagnosis. Indeed for the specialist any simplification of present methods, which carries with it a diminution of the risk of ureteral infection,—a risk which accompanies

NOTE.—Read at the Jackson Meeting of the Michigan State Medical Society, June, 1906.

¹ From Dr. Cowie's Private Laboratory.



all instrumental ureteral manipulation,—should receive thorough investigation even though it may prove to be less expeditious.

Several years ago, Giordano, a Venetian surgeon, while performing an operation for removal of the kidney, noticed that when the kidney was drawn into the wound by the usual manipulation, the first urine that passed, after the operation, contained blood. From this he conceived the idea of externally kneading the kidney, with the hope that if products of inflammation were present they would be caused to flow down the ureter and appear in the urine. He practised his method in a case of renal calculus with positive results. Nicolich soon after verified Giordano's findings by means of a very slightly modified technic.

A brief history of my case is as follows:

John R. M., a student, aged 24, came to me February 24, 1904, complaining of distress in the stomach after meals, a heavy feeling in the epigastrium at various times, and occasional eructations of gas. These symptoms had bothered him for many months. There had never been vomiting, and the pain had never been acute. No loss of weight.

Physical Examination.—Well-developed musculature, large frame. The skin is sallow over the body. The face has a distinctly muddy hue, the lips are thick and there is nasal obstruction. The panniculus is thick. No edema.

The chest is large and well formed. The supraclavicular spaces are full and the epigastric angle wide. The expansion is good and symmetric. Auscultation and percussion are negative.

Heart.—The apex beat is inside the nipple line, fifth intercostal space. Dulness is not



increased. There is a faint diastolic murmur at the aortic area. Otherwise the auscultation is negative.

The abdomen is on a level with the ribs, symmetric. Inspection is negative. There is slight tenderness on pressure over the epigastrium, otherwise negative. The kidneys cannot be felt. The liver and spleen are not enlarged. Distention of the stomach with air shows the greater curvature two fingers' breadth above the navel, the lesser curvature cannot be made out. Prostate negative.

Result of Stomach Analyses.—Achlorhydria, absence of pepsin and rennet, presence of pepsinogen and renninogen, total acidity reaching as high as 18, large amount of mucus. Several meals.

Urine Analyses.—February 24, 1904. Fresh sample. There is uniform cloudiness immediately after micturition. Slightly acid. Albumin one-ninth per volume. Sediment contains large numbers of leukocytes, no blood, no casts. He says that this cloudiness of the urine has been present for a long time. It has never caused him any discomfort. He consulted a physician about it and it was thought to be of no serious moment. He has not given it much attention of late. He has had no venereal disease.

February 25.—Fresh urine cloudy as before. The pus is made up of large numbers of mononuclear leukocytes.¹ The majority seem to be of this type. No acid resisting bacilli found. From now on the urine was examined every day for acid resisting bacilli. They were suggested by the mononuclear leukocytes. None was found.

February 29.—Fresh urine collected in three tubes. Each tube is uniformly cloudy, albumin

¹The term mononuclear leukocyte is used synonymous with mononuclear cell, and not in the generic sense.

and leukocytes continue as before. No acid resisting bacilli can be found.

Diagnosis.—Chronic mucous gastritis and a provisional diagnosis of tuberculosis of the genitourinary passage, probably of the kidney, was made.

March 9.—Fresh urine collected in three tubes. All of the same cloudiness. There are a number of small floaters. These are made up of leukocytes, many of which are mononuclear. One large bunch of acid resisting bacilli. Resistant to 25 percent nitric acid ten minutes and to alcohol.

March 12.—Mononuclear cells as before. One thread. No acid resisting bacilli.

March 18.—Fresh urine shows only very slight cloudiness and only a very slight ring with Heller. Washed sediment shows many acid resisting bacilli.

March 19.—Fresh urine shows only very slight cloudiness and only a very slight ring with Heller. Washed sediment shows many acid resisting bacilli.

March 19.—Fresh urine collected in four tubes. All tubes have the same turbidity which quickly settles to the bottom leaving the supernatant fluid perfectly clear. The centrifugal sediment washed with distilled water. Two slips examined carefully show large numbers of mononuclear leukocytes but no acid resisting bacilli.

March 21.—Fresh urine shows only a very slight cloudiness. No albumin.

March 30.—Urine turbid. No albumin. Sediment contains comparatively few leukocytes.

Kidney Massage Experiment.—The bladder was washed with sterile water until the water returned perfectly clear. The patient was then turned on the right side and the left kidney massaged vigorously five minutes, by kneading, grasping the abdominal wall in the region of the kidney between the thumbs and fingers of both hands and pressing high up under the ribs,

having the patient take a deep breath and while it was held the kneading continued. Percussion was performed by having the back made tense. All forms were applied directly over the kidney region.

A catheter was introduced but no urine flowed. The bladder was washed with 125 cc. sterile water, and the water collected in a sterile flask. It was very turbid.

The patient was now turned on the left side and the manipulations repeated for six minutes. No urine followed the introduction of the catheter. The bladder was washed as before and the water returned practically clear. There were a few shreds of mucus containing some leukocytes having the same character as those from the opposite side.

It was very easy to demonstrate tubercle bacilli in the sample from the left kidney and the leukocytes were very numerous, large numbers being of the mononuclear type. No bacilli were found in the urine from the right kidney. This was in all probability, an exception to what might be looked on as the rule, as the material recovered was doubtless from the left kidney, and it should be expected that a few tubercle bacilli would be found. The presence of a few cells in the washings after the massage of the right kidney in no way militates against the value of the test. Indeed it might have been done away with very easily by performing the kidney massage on each side, on separate days, thus giving the affected side a period of rest. In the event that no collection of pus was obtained by the first massage, a collection after the second would be positive evidence of disease of that side.

Tuberculin Test.—One milligram of tuberculin was injected at 10:30 a. m., April 17. Two hours later, the patient complained of nausea. This was soon followed by intense vomiting which recurred at intervals of 15 or

20 minutes for about two hours. At six p. m., he began to complain of pain in the small of the back. His breathing was labored, eyes were injected, face flushed, temperature 102.6°. The pain in the left small of the back grew very severe but gradually subsided toward morning when the temperature reached 99.4°. At this time the general symptoms had disappeared and he was feeling quite comfortable.

April 20.—Urine obtained the morning after the tuberculin test was dark yellow, turbid, sediment on standing, one-half inch, albumin nearly half per volume, almost pure pus. There were large numbers of mononuclear leukocytes and many polynuclears. Acid resisting bacilli were easy to demonstrate, all forms, many of them beaded and they occurred in large groups and isolated. Their resistance is high to nitric acid and absolute alcohol.

April 21.—Fresh urine one-fourth per volume albumin. Acid resisting bacilli same as yesterday.

Left nephrectomy was urged, but was not permitted. The patient, however, promised to return at the end of a year. During the interim he sent his urine to me from time to time. It continued to be cloudy up until a few weeks of his return, after which it remained perfectly clear, without sediment. After his return it was examined every day for several days; during this time, not a mononuclear leukocyte could be found, and there was nothing in the urine to suggest kidney disease. The operation was still urged and on June 21, 1905, Dr. Darling and I operated. Lumbar incision was chosen. We had great difficulty in getting the kidney into the wound; it was only by means of a gauze sling that we succeeded. When the kidney came into view its appearance was that of healthy tissue, indeed it was so normal in appearance that the question of dropping it back was suggested by one or two present.

Neither of these men, however, had seen the patient before. The operation was undergone entirely upon my initiative and in view of present data contrary to tuberculosis, it seemed that possibly a mistake had been made and that possibly if tuberculosis was present it must be on the opposite side, in some of the structures below the kidney, or in some other part of the body. However, when the scalpel was thrust into the median line large quantities of typical semifluid pus escaped with spurt. The kidney was removed with some difficulty owing to adhesions and the lumen of the ureter treated for an inch of its length with 95 percent carbolic acid, ligated, and dropped into the wound. After thorough flushing of the cavity it was closed and drained.

Examination of the kidney showed it to be lobulated on both sides. The capsule was not adherent. There were no miliary spots. When opened, the entire parenchyma was involved in abscess masses; only the interstitial tissue remaining. The pelvis was completely filled in with granulation tissue, thus blocking off the ureter completely, explaining the absence of signs in the urine, and practically assuring absence of infection below.

The patient made an uneventful recovery with the exception of a slight sinus which persisted for many months but which is now perfectly healed. He has suffered no inconvenience from the loss of his kidney, as it had ceased to functionate long before it was removed, and the right kidney had gradually developed compensation. The urine has continued to remain clear since the operation and there is at present no indication of further tuberculous involvement. The patient feels perfectly well.

Since Widal's paper in 1900, very much has been written concerning the importance of cytologic examinations of pleural, spinal, and

synovial exudates. It is now well established that when these exudates are of tuberculous origin the predominating cells are lymphocytes, and when they are of pneumococcus, streptococcus, or other bacterial origin the polymorphonuclear neutrophiles prevail. On the other hand, very little attention has been given to the cytologic examination of the urine, and especially has this been so since the advent of the tubercle bacillus. Before this time, caseous bits and elastic tissue were sought for, and much importance was attached to these. Pus in the urine has generally been spoken of simply as pus, without any particular reference to the character of the cells that compose it. Pus from the kidney was and still is differentiated from pus having its origin in the bladder by the degree of preservation of the cell form. The urine in tuberculosis of the kidney being usually acid has not the tendency to disintegrate or distort the cell as does the ammoniacal urine which is so characteristic of cystitis, particularly of that in long-standing cases. This fact, which enables us to study clearly the morphologic characters of the cells in almost all cases of kidney inflammation, has been set aside without any further importance being attached to it. "Pure tuberculous pus" occurring in any part of the body is usually described as "pus consisting of a fine detritus of caseous material, fatty and granular cells, and few leukocytes. More typical pus is produced when mixed infection occurs, but even then the microscopic appearances of the pus are different from those of nontuberculous pus," (Hektoen, Ref. Hand Book Med. Sc., Vol. 1, 46)

but no reference to the character of the cells is given.

A careful examination will show that the principles that hold true in serous cavities obtain in the urine, and were recognized long before present-day cytologic investigations were commenced. We have been teaching this in the medical clinic of the University Hospital for years, at least as long ago as 1894, the stress being put upon the importance of fishing out small particles from all urines, examining their macroscopic and microscopic appearance, expecting in caseous looking bits to find many cells of the mononuclear type associated with tubercle bacilli. If mononuclear cells were found, it meant search for tubercle bacilli, the same as the finding of casts prompts us to test for albumin or *vice versa*. The two have always gone hand in hand. Accordingly it was not with little surprise that I found a diligent consultation of textbooks, reference books, and journals, fruitless in disclosing any knowledge of this valuable accessory to genitourinary diagnosis.

Dr. Warthin informs me that in 1894 he examined a number of cases of gleet of long standing and found in the threads many mononuclear cells. This is an important point, worthy of further elucidation and should be borne in mind when attempting a differential diagnosis.

It must be remembered that the sediment of tuberculous urine is not entirely made up of mononuclear leukocytes. They are frequently in excess of the polymorphonuclears. Any goodly number should always suggest tuberculosis. If the character of the cells were deter-

mined in every urine showing an excess of leukocytes, tuberculosis of the genitourinary passages would frequently be diagnosed earlier than it often is. In an acid urine, even without washing the sediment, particularly if the urine is fresh, ordinary staining with Loeffler's methylene blue will show the nuclear bodies sufficiently well. Some cells stain poorly because of degenerative changes in their nuclei. A certain amount of care should be always given to the preparation of urine sediment for staining. The spread should be thin, so that the cells will be isolated as much as possible from one another. This refers more particularly to centrifugal sediment. Floaters, or crumb-like bits, after draining off the excess of urine with pieces of filter paper placed simultaneously on either side to balance the capillary attraction, can be teased gently, slowly dried, fixed in the ordinary way and stained. For closer cell study, Wright's stain or better hematoxylin and eosin may be used.

This case also illustrates the value of the tuberculin test, not only as a means of proving that tuberculosis is present in the body, but of determining its location. Almost always, particularly if a moderately large dose is given, a local reaction occurs. The tuberculin test, in this case, proved the origin of the mononuclear cells, the identity of the bacilli, and verified the disclosure of the kidney massage.

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